1962 ANNUAL REPORT

ARCTIC-YUKON-KUSKOKWIM AREA

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

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Anchorage, Alaska

EULOGY

It is with deep regret that we report the death of Lester E. Varozza. On July 23, 1962, Mr. Varozza was killed in a small plane crash near Quinhagak, Alaska, in the course of his management duties. At the time of the crash, he was aboard a plane flying supplies into a remote counting tower station on the Kanektok River.

Les was born on August 25, 1933, in Sacramento, California. He attended Sacramento State College, graduating with a Bachelor's Degree in biology in February, 1962. Les worked as a seasonal aide with the California Department of Fish and Game in Sacramento for a total of sixteen (16) months prior to his graduation. In May, 1962, he gave up a well-paying position at the Aerojet General Corporation in California to move to Alaska with his wife, Geraldine.

The Varozza family arrived in Anchorage on May 18, 1962. Almost immediately, Les had to leave for the field to assume his duties of Assistant Area Management Biologist for the Kuskokwim District of the Arctic-Yukon-Kuskokwim Area, Division of Commercial Fisheries. From his arrival to the date of his untimely death, Les proved himself equal to handling the duties of a management biologist responsible for the many complex problems associated with the fisheries of a large system such as the Kuskokwim.

In the short time that Les worked on the Kuskokwim, he gained the friendship and respect of the men working for him, the public, and his fellow biologists. He was a good friend and a dedicated biologist. We will miss him.

Steven Pennoyer
Area Management Biologist

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INTRODUCTION

The Arctic-Yukon-Kuskokwim Area of the Commercial Fisheries Division encompasses all drainages in Alaska north of Bristol Bay, an area of some 400,000 square miles.

The 1962 season marked the farthest expansion of commercial fishing in the Arctic-Yukon-Kuskokwim Area in recorded history. Aerial surveys by Project Chariot (AEC) personnel in 1960 and interviews by the Alaska Department of Fish and Game in 1961 indicated the presence of commercially harvestable chum runs at Kotzebue. In 1962, two floating canneries operated at Kotzebue, the first commercial salmon operation of any magnitude in this area. Commercial operations in Norton Sound increased to include fishing at Golovin Bay, Moses Point, and Norton Bay as well as Unalakleet and Shaktoolik. This increase is the result of the joint efforts of industry and management in exploring the fisheries resource and the desire of the public in this remote area for an increased economy.

This report is a summary of fisheries and biological investigations carried out in 1962. Data is presented by district starting with the Kuskokwim district and working north. Figure 1 is a map of the area. Table I presents the total salmon catch by district for the area.

ARCTIC-YUKON-KUSKOKWIM AREA

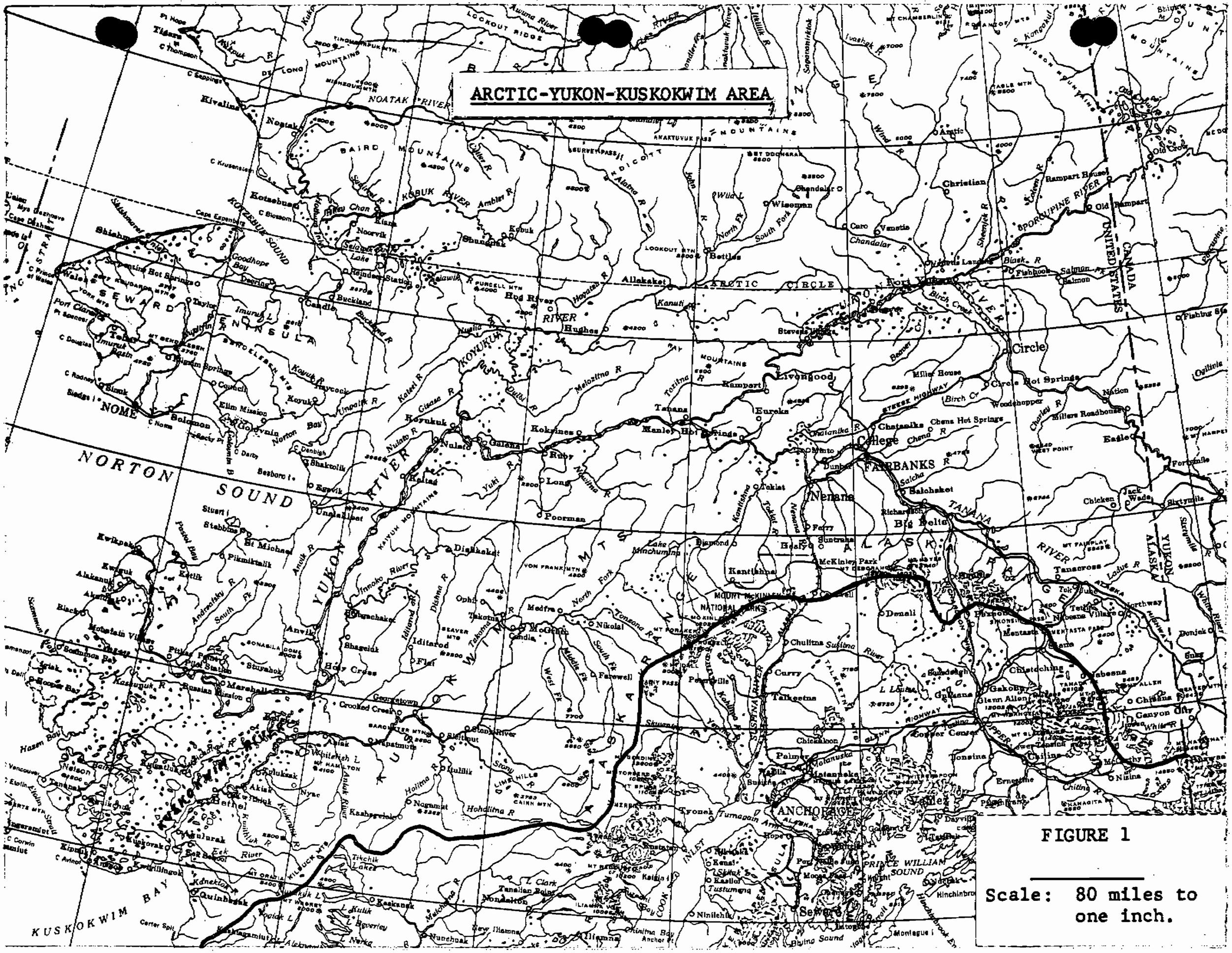


FIGURE 1

Scale: 80 miles to one inch.

TABLE I

ARCTIC-YUKON-KUSKOKWIM
TOTAL SALMON CATCH BY DISTRICT, 1962

District	Kings	Chums	Reds	Pinks	Silvers
KUSKOKWIM:					
Commercial	15,349	6	0	0	12,563
Subsistence	13,596	145,065	19,352		
SUB-TOTAL	28,945	145,071	19,352	0	12,563
KANEKTOK:					
Commercial	5,526	45,707	10,313	4,340	35
YUKON:					
Commercial	94,734	53,723	12	32	23,339
Subsistence	19,910	356,754		549	1,138
SUB-TOTAL	114,644	410,477	12	581	24,477
NORTON SOUND:					
Commercial	7,286	182,784	83	33,187	9,156
KOTZEBUE:					
Commercial	12	129,948	7	107	1
Subsistence		100,000*			
SUB-TOTAL	12	229,948	7	107	1
GRAND TOTAL FOR A-Y-K AREA**					
1962	156,413	1,013,987	29,767	38,215	46,232
1961	201,358	646,126	56,772	36,625	21,752

* Most of the salmon surveyed were chums, however a few of other salmon species are included in this total. As surveys were incomplete in some villages, this figure is an estimate of total utilization

**In 1962, subsistence catches were not documented in the Norton Sound district or the Kanektok subdistrict. In 1961, subsistence catches were documented only in the Yukon and Kuskokwim districts.

YUKON DISTRICT

Both commercial and subsistence catches of king salmon were lower in 1962 than 1961 on the Yukon River (see Table I). The major cause for this decline was apparently water conditions. Breakup on the lower Yukon was not complete until June 10. The heavy snowpack of the severe winter of 1961-1962 caused flooding throughout June, July, and August from Nenana on the Tanana River downstream to the mouth of the Yukon. Many fish camps and fishing locations were rendered inoperable due to high water.

COMMERCIAL FISHERY AND ESCAPEMENT--KING SALMON:

Due to the late breakup on the lower Yukon, the commercial fishery for king salmon did not get underway until June 11. Tables XIV, XV, XVI, and XVII show pertinent catch statistics for the commercial fishery. Figure 14 compares catch per man per hour by day with 1959, 1960, and 1961. Fishing started on the normal four day per week schedule: 6:00 p.m. Sunday to 6:00 p.m. Thursday in sub-district #1 and 6:00 p.m. Tuesday to 6:00 p.m. Saturday in sub-district #2. Comparative gear statistics for 1961 and 1962 are presented in Table XIII.

As usual, the majority of the gear in sub-district #1 was concentrated in the south mouth. Catches during the first week were almost exclusively south mouth fish. Middle mouth fish enter the river about one week later than the south mouth run. Two freezerships and one mild cure barge fished in sub-district #1 in addition to the older established operations (see List of Operators, Table XXX). However, these new operators experienced difficulty entering the river and their fishermen did not fish commercially prior to June 17 (see Table XIV). Many of these fishermen were inexperienced and contributed to to the lowered average catch per unit of effort in 1962.

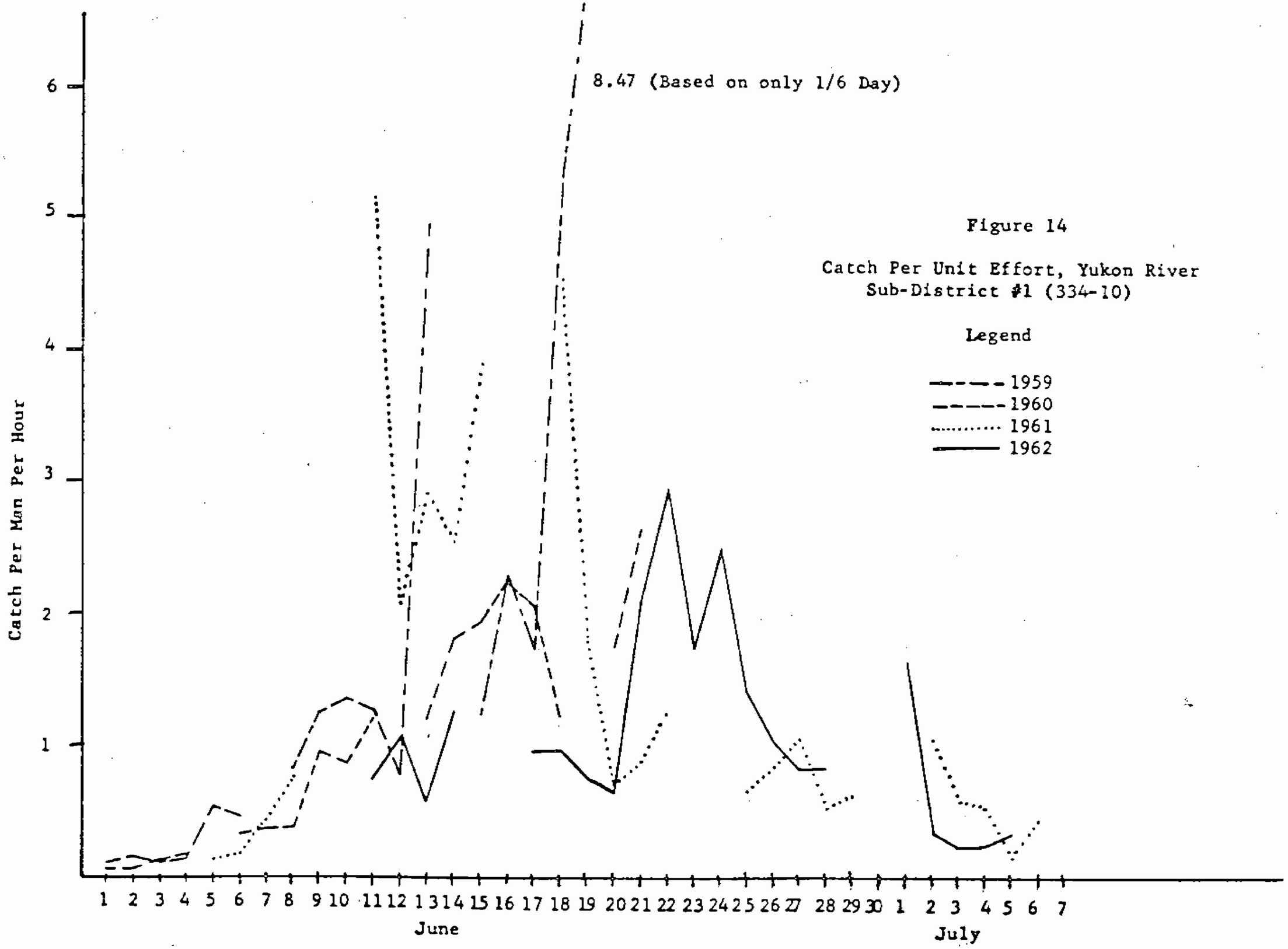


Figure 14

Catch Per Unit Effort, Yukon River
Sub-District #1 (334-10)

Legend

- 1959
- 1960
- 1961
- 1962

TABLE XIII

FISHING EFFORT YUKON RIVER, 1961 AND 1962
(Taken From Licenses Issued)

Type of License	Year	Y-1	Y-2	Y-3	Y-4
Commercial:					
	1961	238	130	26	18
	1962	321	148	46	18
Vessel:					
	1961	225*	115**	18	10
	1962	340***	130****	31	12
Gear:					
Drift	1961	17 (925F)	86 (5,130F)		
	1962	55 (3,200F)	98 (6,750F)	24 (1,730F)	
Set	1961	217 (25,560F)	101 (6,050F)	19 (691F)	1 (50F)
	1962	303 (35,470F)	117 (6,465F)	14 (900F)	2 (100F)

* Includes 15 tenders.
** Includes 3 tenders.
*** Includes 20 tenders.
**** Includes 3 tenders.

TABLE XIV

YUKON RIVER COMMERCIAL KING SALMON CATCH, 1962
SUB-DISTRICT #1, JUNE SEASON, SET NET CATCH (04)
334-10

Date	Hours Fished	King Salmon Catch	Number of Fishermen	Average Catch Per Fisherman	Catch Per Man Per Hour
June 9					
10	6				
11	24	1,096	62	17.7	.74
12	24	2,297	88	26.1	1.09
13	24	1,267	92	13.8	.58
14	18	3,286	147	22.4	1.24
15					
16		Closed to Commercial Fishing			
17	6	167	29	5.8	.97
18	24	4,427	189	23.4	.98
19	24	3,161	179	17.7	.74
20	24	3,121	205	15.2	.63
21	18	8,698	230	37.8	2.10
22	6	956	55	17.4	2.90
23	24	8,686	208	41.8	1.74
24	12	4,711	158	29.8	2.48
25	24	7,544	222	34.0	1.42
26	24	5,174	208	24.9	1.04
27	24	4,427	219	20.2	.84
28	18	3,243	212	15.3	.85
29					
30		Closed to Commercial Fishing			
July 1	6	225	23	9.8	1.63
2	24	1,686	201	8.4	.35
3	24	899	147	6.1	.25
4	24	932	158	6.2	.26
5	18	1,019	164	6.2	.34
		Closed to Commercial Fishing			

Total Catch = 67,072
Average Catch Per Boat Per Season = 209.6
Average Catch Per Man Per Hour = 0.98
Average Number of Fishermen Per Date = 152.2
Average Number of Fishermen Per Day = 182.6 1961: 158.8
Total Man Days Fished = 2,349
Total Days Fished = 17.50

TABLE XV

YUKON RIVER COMMERCIAL KING SALMON CATCH, 1962
SUB-DISTRICT #2, SET NET AND DRIFT NET CATCH COMBINED
334-20

Date	Hours Fished	King Salmon Catch	Number of Fishermen	Catch Per Man Per Hour
June 13	24	211	36	0.24
14	24	535	67	0.33
15	24	625	81	0.32
16	18	836	93	0.50
17				
18		Closed to Commercial Fishing		
19	6	175	13	2.24
20	24	1,149	95	0.50
21	24	1,465	78	0.78
22	24	1,761	82	0.89
23	18	1,503	101	0.83
24				
25	6	131	6	3.64
26	24	1,928	79	1.02
27	24	3,820	101	1.58
28	24	1,627	75	0.90
29	24	1,740	83	0.87
30	18	1,371	106	0.72
July 1				
2		Closed to Commercial Fishing		
3	6	128	7	3.05
4	24	935	94	0.41
5	24	384	80	0.20
6	24	100	26	0.16
7	18	0	0	0.00
		Closed to Commercial Fishing		

Total Catch = 22,224
Average Catch Per Boat Per Season = 175.00
Average Catch Per Man Per Hour = 0.77
Average Number of Fishermen Per Date = 68.6
Average Number of Fishermen Per Day = 81.4
Total Man Days Fished = 1,209
Total Days Fished = 16.00

TABLE XVI

YUKON RIVER COMMERCIAL KING SALMON CATCH, 1962
SUB-DISTRICT #3, ALL GEAR COMBINED
334-30

Date	Hours Fished	King Salmon Catch	Number of Fishermen	Catch Per Man Per Hour
June 16	24	21	1	0.88
17	24	19	1	0.79
18	24	36	1	1.50
19	24	103	4	1.07
20	24	211	4	2.20
21	24	102	7	0.61
22	24	795	10	3.31
23	24	622	14	1.85
24	24	738	10	3.08
25	24	387	8	2.02
26	24	488	14	1.45
27	24	235	8	1.22
28	24	276	8	1.44
29	24	654	15	1.82
30	12			

Closed to Commercial Fishing

Total Catch = 4,687
Total Days Fished = 14
Total Man Days Fished = 105
Average Catch Per Man Per Hour = 1.86
Average Number of Fishermen Per Day = 7.5

TABLE XVII

YUKON RIVER COMMERCIAL KING SALMON CATCH, 1962
SUB-DISTRICT #4, FISHWHEEL CATCH
334-40

Date	Hours Fished	King Salmon Catch	Number of Fishermen
June 29	24	1	1
July 1	24	8	1
2	24	17	1
3	24	17	3
4	0	0	0
5	24	37	1
6	0	0	0
7	24	31	1
8	24	54	1
9	24	44	2
10	24	58	2
11	24	57	2
12	24	67	2
13	24	75	2
14	24	62	2
15	24	72	2
16	24	65	2
17	24	32	2
30	24	27	1

Total Catch = 724

TABLE XVIII

YUKON RIVER COMMERCIAL SALMON CATCH, 1962
SUB-DISTRICT #1, AUGUST SEASON, SET NET CATCH (04)
334-10

Date		Hours Fished	Kings	Reds	Cohos	Pinks	Chums	Total Catch Per Day	Number of Fishermen	Average Catch Per Man Per Hour
August	1	24	1	3	95	3	666	768	81	.40
	2	18	1	5	121	4	2,615	2,746	123	1.24
	3									
	4		Closed to Commercial Fishing							
	5	6	0	0	40	0	513	553	16	5.76
	6	24	2	3	684	10	6,292	6,991	146	2.00
	7	24	1	0	478	2	2,334	2,815	129	0.91
	8	24	2	0	542	3	2,678	3,225	141	0.95
	9	18	4	0	354	5	1,267	1,630	140	0.65
	10									
	11		Closed to Commercial Fishing							
	12									
	13	24	2	1	470	0	413	886	113	0.33
	14	18	0	0	383	1	173	557	108	0.29
	15	6	0	0	5	0	11	16	4	0.67
	16	24	1	0	486	0	304	791	81	0.41
	17	24	1	0	640	0	396	1,037	114	0.38
	18	18	1	0	651	4	1,436	2,092	108	1.08
	19	6	0	0	98	0	598	696	11	10.55
	20	24	1	0	3,365	0	7,611	10,977	130	3.52
	21	18	0	0	2,441	0	7,405	9,846	129	4.24
	22	6	2	0	889	0	2,093	2,984	64	7.77
	23	24	2	0	3,138	0	7,061	10,201	114	3.73
	24	24	0	0	1,893	0	3,735	5,628	104	2.25
	25	18	2	0	1,065	0	1,860	2,927	90	1.81
	26	6	0	0	14	0	33	47	5	1.57
	27	24	3	0	1,047	0	937	1,987	67	1.24
	28	18	0	0	1,473	0	1,293	2,766	78	1.97
	29	6	0	0	212	0	179	391	17	3.83

TABLE XVIII (Cont'd)

Date	Hours Fished	Kings	Reds	Cohos	Pinks	Chums	Total Catch Per Day	Number of Fishermen	Average Catch Per Man Per Hour
August 30	24	0	0	1,050	0	558	1,608	62	1.08
31	24	0	0	934	0	487	1,421	54	1.10
September 1	18	1	0	112	0	83	196	8	1.36
2	6	0	0	246	0	85	331	12	4.60
3	Closed to Commercial Fishing								
TOTALS:		27	12	22,926	32	53,116	76,113		

Total Man Days = 1,956
Average Catch Per Day = 38.9

During the first week of fishing, good catches (individuals catching up to 222 kings per day) were made in the mid-upper portion of sub-district #1 while catches at the mouth of the river were relatively low. This, plus the fact that the first king was caught June 9 at Mountain Village, 78 miles upstream, indicates that a peak of the run bypassed the majority of the gear at the mouth either under the ice, or right after the ice went out while the fishery was closed (prior to 6:00 p.m. June 10). Catches at the mouth started to pick up again just prior to the closure on the evening of June 14. By the time the fishery re-opened on June 17 at 6:00 p.m., this peak had already bypassed the concentration of gear at the mouth of the south mouth. It contributed significantly to catches at the upper end of sub-district #1 with individuals making catches of up to 142 kings per day. This peak contributed catches of up to 347 kings per day for individual fishermen at the upper end of sub-district #2 and apparently passed through most of this sub-district untouched. It also shows up in catches at Paimiut (up to 130 kings per day per individual) and Kaltag.

Throughout the season, sporadic high catches by gear in upriver locations showed that kings were passing through major portions of the gear even during open periods. Escapement through the first part of the run, therefore, was exceptionally good due to high water and drift reducing the efficiency of the gear, and peaks passing through the fishery during closed periods. Because of this, an extension of fishing time was allowed by emergency regulation of 36 hours on June 22-24 in sub-district #1 and of 24 hours on June 25-26 in sub-district #2.

Peak catches in sub-district #1 occurred on June 21-24 in 1962 as compared to June 11-18 in 1961. As illustrated in Figure 14, the catch per unit of effort in 1962 does not exhibit the extreme peaks shown in 1959 and 1961.

Nor do they rival those of 1958, shown in the 1961 Annual Report. This is probably due, at least partially, to the depressant effect of high water and drift. The late peak may be due to the late breakup holding the run out of the river. On the other hand, the peak recorded in the commercial catch may not have been the major peak in the run. The June 21-24 peak conforms more or less in magnitude and date with the third and minor peak noted in 1960 and 1958. If this is the case, the major peak of the run may have passed through the fishery June 14-17 during the closure. Over the last four years, the major peak of the run has entered the sub-district #1 catch June 11-19, and in 1960, this peak occurred from June 13-17. The run passing through the majority of the gear in sub-district #1 June 14-17, 1962, was large as illustrated by catches taken from it in certain locations; however, it is impossible to estimate its total size. It was of short duration, taking at the most three days to pass any given location.

The average catch per man per hour in sub-district #3 was higher than in either of the two sub-districts below it (see Table XVI). This illustrates again that, for at least the portion of the run entering sub-district #1 prior to June 19, escapement was quite good. Although the number of fishermen was small, only an average of 7.5 men per day and they did not fish through the end of the run, an average catch of 1.86 kings per man per hour is as high as any sub-district in any year we have records for except sub-district #1 in 1953.

Upriver checks on king salmon escapement are largely lacking. The only stream surveys flown on the Yukon in 1962 were of the Andreafsky River and the Salcha River near Fairbanks. The Andreafsky with 1,417 kings counted in it on July 30 compares favorably with past years. Only 937 kings were counted in the Salcha River on August 2 and 4 as compared to 2,878 on July 23, 1961 and 1,660 on July 30, 1960. However, the 1962 survey was late, and was flown by a

different observer than the past three years. These two surveys are not enough to make any general statements about the escapement.

The only good measure of escapement is for that portion of the king salmon run passing the proposed Rampart Damsite. The U. S. Fish and Wildlife Service Branch of River Basins carried out a tagging program there in 1961 and 1962. In 1961, they estimated that approximately 17,000 king salmon passed the proposed damsite, while in 1962, their estimate was 22,000. Because of the small number of kings tagged in 1961, their estimate may have been in error; however, there is no question that the run in 1962 was much larger than in 1961. Canadian sources stated that the king run in Yukon Territory was one of the largest in history.

COMMERCIAL FISHERY AND ESCAPEMENT--SMALL SALMON:

In August, three companies participated in the small salmon season. Their catches are listed in Table XVIII. This fishery is prosecuted nearly exclusively on fall chum and coho stocks. About 1/3 of the gear used was 6" stretched mesh gill net and the balance was 5 1/2". In 1961, it was noted that a peak of the fall chum run passed through sub-district #1 prior to the opening of the commercial fishery. The chum catch steadily declined from August 1 on. The coho catch increased slightly on August 21-22, but not enough to influence the total salmon catch by very much. In 1962, apparently the same pattern of runs occurred up to a point. Subsistence catch data at the mouth of the Yukon and run-timing data from the tagging site at Old Andreafsky indicate that a peak of the fall chum run passed through sub-district #1 on July 23-26 or 27 prior to the opening of the commercial fishery on August 1. At the time that the commercial fishery opened, apparently few fall chums were in the area as evidenced by the low catch per unit of effort. On August 2, the catch started

to pick up. Fishwheel catches at our tagging site and subsistence catches in sub-district #1 indicate that a peak of the fall run chums passed through the commercial fishery during the closure of 6:00 p.m. August 2 to 6:00 p.m. August 5. This is borne out by the catches on August 5 and 6 which were high and apparently represent the latter portions of this peak. Chum salmon catches steadily declined from August 7 until August 20. On August 20-23, another peak of fall run chums passed through the fishery. This peak did not occur in 1961. Coho catches also peaked during this period. This unexpected peak was heavily fished since the fishery was open five days per week at the time.

The August fishery opened on a four day per week basis (6:00 p.m. Sunday to 6:00 p.m. Thursday). By August 13, it was judged that the bulk of the fall chum run, an important subsistence fish, had passed through sub-district #1 either prior to the opening of the commercial fishery or during closures. Since an adequate escapement had apparently been secured, fishing time was increased to five days per week on a staggered basis (6:00 p.m. Sunday to 6:00 p.m. Tuesday and 6:00 p.m. Wednesday to 6:00 p.m. Saturday). The unexpected late peak in the run (August 20-23) was therefore heavily fished. However, the overall escapement of fall run chums was at least adequate since so much of the early and apparently major portion of the run was totally unfished by the commercial fishery.

Gear in sub-district #1 during the August season more than doubled in 1962 over 1961. Much of the gear was fished through September 2 in 1962 whereas the major operator in 1961 stopped fishing on August 22. Fishing through the latter portion of the run as in 1962 would tend to depress the average catch per man day, as would missing the first two peaks in the run. Nevertheless, the catch per unit effort in 1962 was much lower than in 1961. In 1962, a total of 1,956 man days were fished yielding an average catch per man day of 38.9 fish. In

1961, 584 man days were fished yielding an average catch of 77.9 fish per man day. It would appear that any further increase in gear will not yield a proportionate increase in catch. However, this judgement is based on only two years fishing and the chum run may have been at a low level.

PACK:

Pack for the Yukon district is included with the area pack shown in Table XXXI. Kings averaged 3.1-3.3 per case, chums 10.5 per case, and silvers 13.3 per case. King salmon pack was 31,918 cases of one-half pound cans, 464 tierces of mild cure and 280 one-half tierces of hard salt. A total of 1,025 one-half pound cases of cohos and 3,520 one-half pound cases of chums were also packed. In addition, some kings, chums, and cohos were shipped out fresh or frozen. These fish are included in the area pack, Table XXXI.

SUBSISTENCE UTILIZATION AND ESCAPEMENT:

The subsistence utilization survey initiated in 1961 was continued in 1962. The Department of Fish and Game surveyed the area from the mouth to Tanana and the Tanana River upstream as far as Nenana. As in 1961, two men in a 17 foot outboard cruiser counted all the fish on drying racks and in smokehouses along the survey route. The 1962 survey was conducted an average of 8.2 days later for each village than in 1961. Catches for the villages of Shageluk and Holikachuk on the Innoko River and Huslia and Allakaket on the Koyukuk River were reported by responsible individuals in each of these villages to whom survey forms were mailed.

The U. S. Fish and Wildlife Service conducted surveys in villages from Rampart upstream to the Canadian border including villages on the Chandalar and Porcupine Rivers. They distributed catch forms to fishermen and checked

these forms periodically throughout the season. Canadian authorities surveyed the subsistence catch in Yukon Territory by personal interview and by mail.

The 1962 survey figures are believed to more nearly represent the total subsistence catch of salmon than 1961 even in equivalent areas. Since the survey was conducted at a later date than in 1961, it takes into account more of the fishing effort. The king, pink, and summer chum catches recorded more nearly represent the total subsistence utilization of these species than either fall chums or coho recorded catches. Some effort took place on fall chums and cohos after the survey crew had passed by, especially in villages above Galena and in the area from the mouth to St. Marys. However, catch forms turned in by individual fishermen in these areas after they stopped fishing indicated that the overall catch was not increased over 10% by catches made after the survey had been concluded.

Table XIX shows comparative catches of chum and king salmon by village for 1961 and 1962. Table XX presents 1961 and 1962 subsistence catch and effort by district for chum and king salmon. Figure 15 graphically shows total numbers of salmon taken and catch per fishing family for each district. Table XX and Figure 15 represent equivalent areas surveyed for 1961 and 1962. Table XIX showing catch by village for 1961 and 1962 presents totals for the drainage and for equivalent areas.

SUBSISTENCE FISHERY DISTRICT ANALYSIS:

Due to differences in utilization of and dependence on the fishery resource, fishing methods, and topography, the Yukon River drainage has been divided into seven districts.

District I extends from the mouth of the Yukon River to just below Mountain Village. This district includes all mouths of the Yukon River. It is an area

TABLE XIX

SUBSISTENCE CATCH DATA BY VILLAGE
YUKON RIVER, 1961 AND 1962

Section of Drainage	Village	Kings		Chums	
		1961	1962	1961	1962
Main Yukon	Sheldons Point and Kwikluak Pass	180	116	12,683	10,899
	Alakanuk	165	53	8,932	5,747
	Kwiguk-Emmonak	137	21	15,670	9,074
	Aproka Pass	171	180	7,303	5,277
	Snotty Slough	8	1	1,106	794
	Hamilton-Kotlik	111	35	3,931	5,362
	Mountain Village	1,110	619	7,373	8,331
	Pitkas Point-St. Marys	1,810	391	8,771	10,510
	Pilot Station	753	219	5,605	13,926
	Marshall	1,265	503	5,992	6,595
	Russian Mission	1,563	641	4,098	9,994
	Holy Cross	2,648	1,111	21,144	20,424
	Anvik	22	51	61,406	43,404
	Shageluk-Holikachuk	25	37	56,284	32,737
	Kaltag	33	224	23,395	25,824
	Nulato	513	171	63,163	27,948
	Koyukuk	483	423	13,544	6,282
	Galena	626	123	10,585	1,673
	Ruby-Kokrines	1,060	226	15,654	18,243
	Tanana	2,379	332	12,775	7,245
	Rampart	605	1,438	11,722	6,962
	Stevens Village	650	831	3,490	4,355
	Beaver	185	442	2,975	2,334
	Fort Yukon	2,958	1,822	13,252	10,255
	Circle	496	393	992	800
	Eagle	875	400	150	100
	Dawson	2,231	2,000	725	3,000
	Ross River	-	500	-	0
	Mayo	-	300	-	0
	Pelly River-Minto	-	2,000	-	1,500
	Carmacks	-	3,000	-	2,000
	Johnson's Crossing	-	1,000	-	0
Innoko River	Shageluk	-	(Few)	-	3,500
	Holikachuk	-	0	-	100
Tanana River	Minto	17	86	4,536	12,455
	Manley Hot Springs	330	6	1,950	4,773
	Nenana	310	115	6,426	13,821

TABLE XIX (Cont'd)

Section of Drainage	Village	Kings 1961	Kings 1962	Chums 1961	Chums 1962
Other Tributaries	Huslia	-	100	-	16,000
	Allakaket	-	-	-	(Few)
	Venetie	-	(Few)	-	1,000
	Cañon Village	-	0	-	210
	Chalkytsik	-	0	-	500
	Old Crow	-	0	-	2,800
TOTALS:		23,719	19,910	405,632	356,754
TOTALS FOR EQUIVALENT AREAS:		23,719	13,010	405,632	329,144

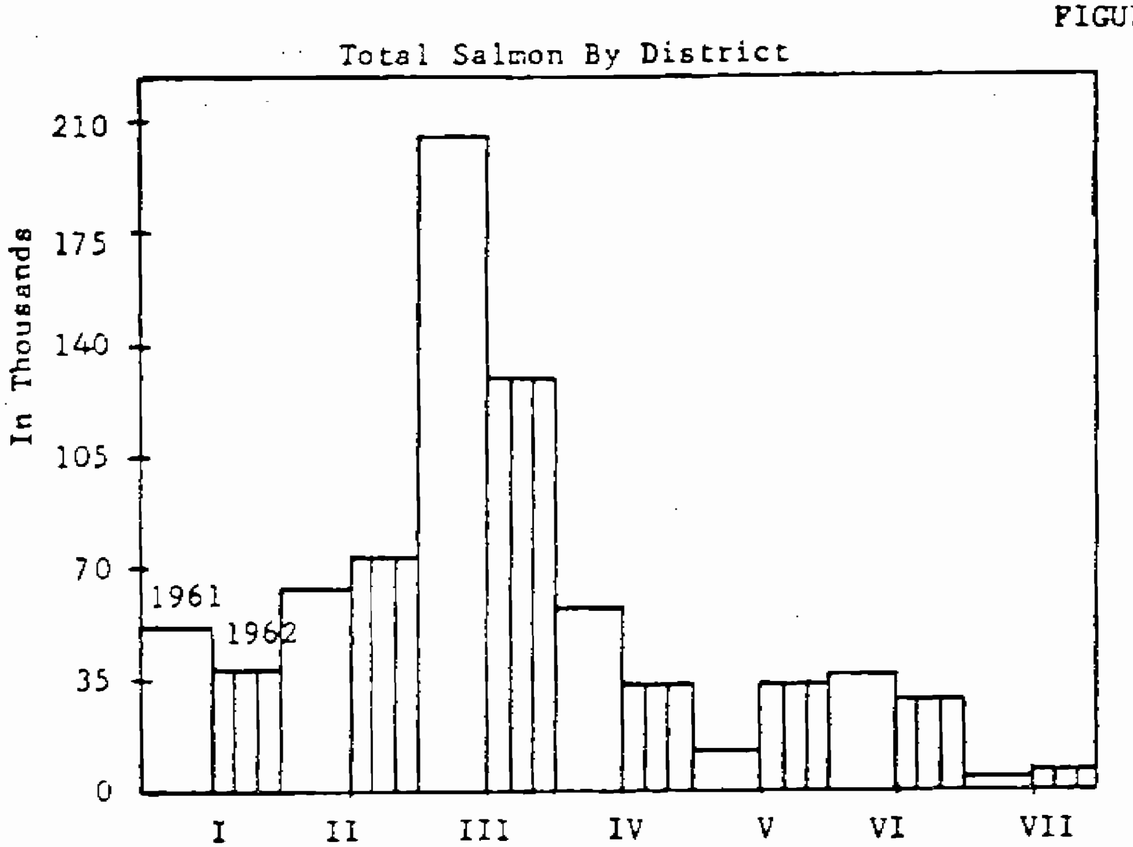
TABLE XX

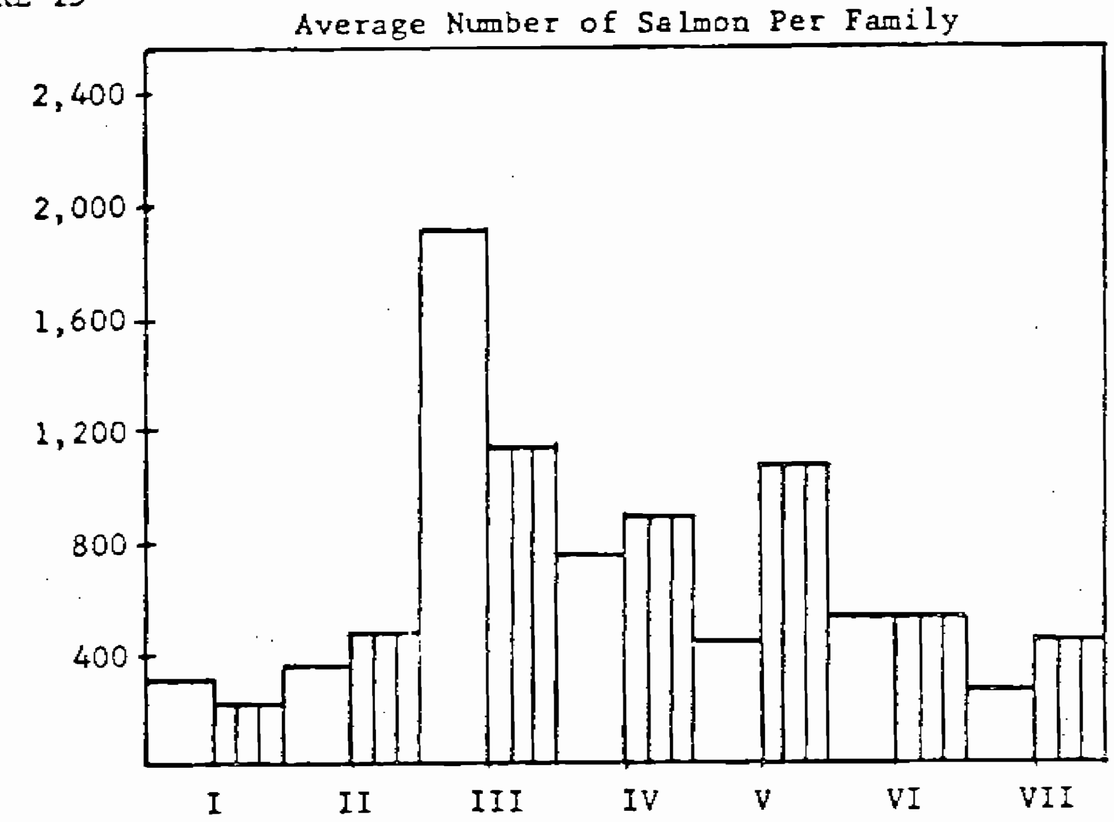
EQUIVALENT SUBSISTENCE SURVEY DATA BY DISTRICT
YUKON RIVER, 1961 AND 1962

	District I		District II		District III		District IV	
	1961	1962	1961	1962	1961	1962	1961	1962
Kings	772	406	9,149	3,484	593	483	4,548	1,104
Chums	49,625	37,153	52,983	69,780	204,248	129,913	52,558	33,443
Pinks	1,355	188	779	357	48	4	0	0
Cohos	0	193	0	28	0	9	0	0
Total Salmon	51,752	37,940	62,911	73,649	204,889	130,409	57,106	34,547
No. Fishing Families	166	170	174	156	108	116	78	39
Av. No. Kings Per Family	4.7	2.4	52.6	22.3	5.5	4.2	58.3	28.3
Av. No. Chums Per Family	299.0	218.5	304.5	447.43	1891.2	1119.9	673.8	857.5
Av. No. Salmon Per Family	311.8	223.2	361.6	472.1	1906.4	1124.2	732.1	885.8
Av. No. Persons Per Family	5.8	5.9	5.8	5.9	5.7	5.5	5.2	6.0
Av. No. Dogs Per Family	7.3	7.3	6.4	5.3	8.5	7.8	10.1	9.9
Units of Fishing Gear:								
Dog Net	218	293	162	129	18	49	31	27
King Net	12	2	86	80	2	3	20	20
Fishwheel	1	1	16	10	44	49	39	21

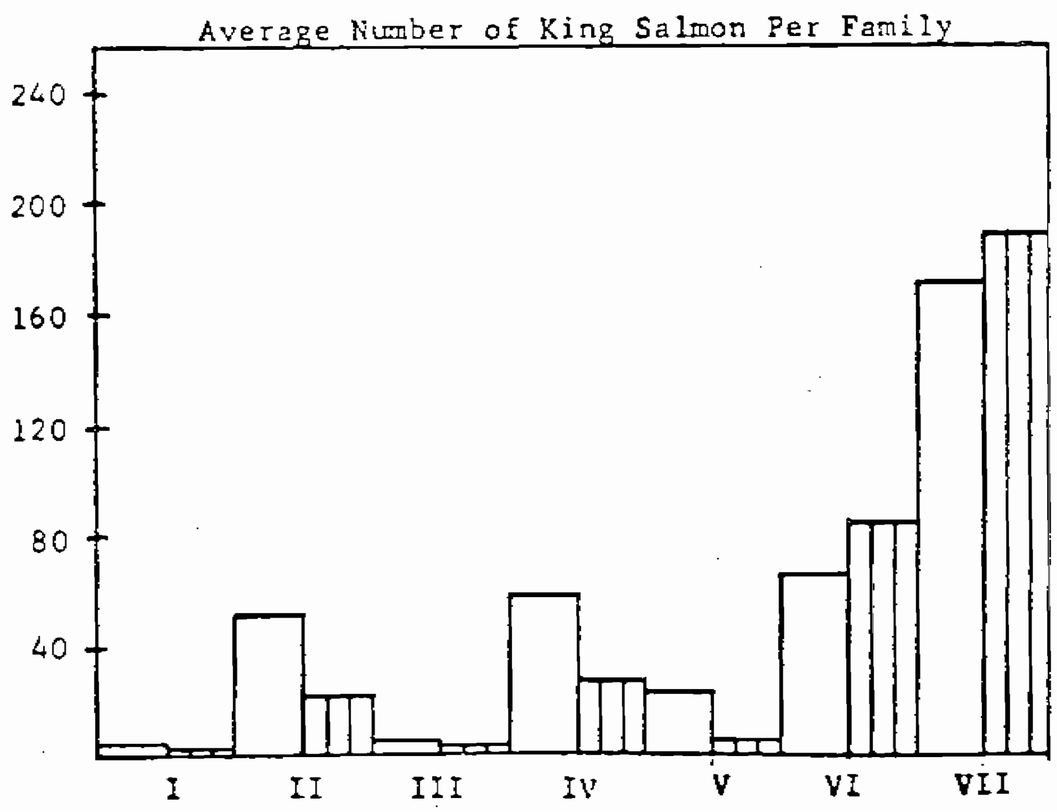
	District V		District VI		District VII		ALL DISTRICTS	
	1961	1962	1961	1962	1961	1962	1961	1962
Kings	657	207	4,398	4,533	3,602	2,793	23,719	13,010
Chums	12,912	31,049	31,439	23,906	1,867	3,900	405,632	329,144
Pinks	0	0	0	0	0	0	2,182	549
Cohos	0	808	0	0	0	0	0	1,038
Total Salmon	13,569	32,064	35,837	28,439	5,469	6,693	431,533	343,741
No. Fishing Families	31	30	67	53	21	15	645	579
Av. No. Kings Per Family	21.2	6.9	65.6	85.5	171.5	186.2	36.8	22.4
Av. No. Chums Per Family	416.5	1035.0	469.2	451.1	88.9	260.0	628.9	568.5
Av. No. Salmon Per Family	437.7	1068.8	534.9	536.6	260.4	446.2	669.1	593.7
Av. No. Persons Per Family	6.0	6.5	6.6	5.6	5.1	4.7	5.8	5.8
Av. No. Dogs Per Family	8.4	7.6	8.3	5.2	3.1	3.3	7.5	6.9
Units of Fishing Gear:								
Dog Net	0	0	7	10	7	11	448	519
King Net	0	0	2	0	7	5	129	110
Fishwheel	28	22	41	35	13	10	182	148

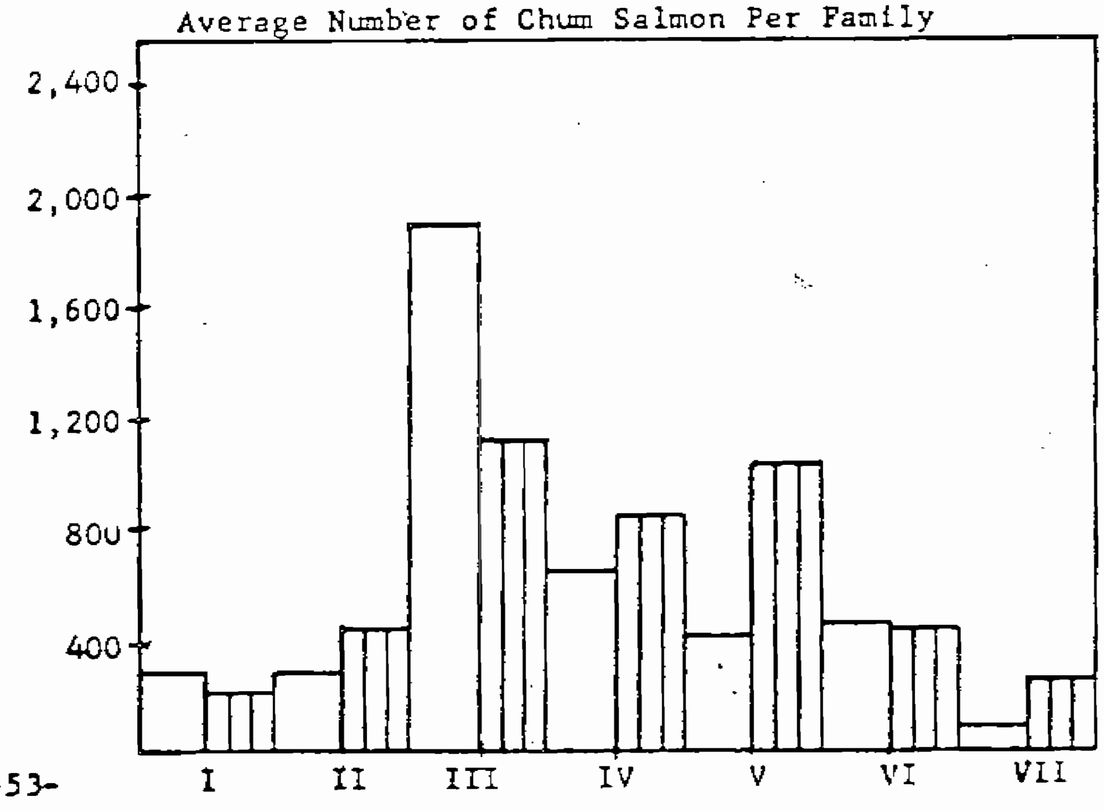
FIGURE 15





1961 AND 1962 YUKON RIVER DISTRICT COMPARISON OF SUBSISTENCE CATCHES FOR EQUIVALENT AREAS





of intensive commercial fishing for king salmon in June. A smaller commercial fishery exists for chums and cohos in August and early September. Consequently, dependence on a salmon subsistence fishery is not as important as in other districts. King nets (8 1/2" mesh) and dog nets (5 1/2" mesh) account for most of the subsistence caught salmon.

The 1962 survey was conducted an average of 8 days later than in 1961, but still the average number of kings, chums, and pinks per fishing family was less in 1962. Factors that would influence the lowered 1962 catches are:

1. In 1961, the number of chums buried underground (chinuk) was estimated and incorporated in the total catches. No attempt was made to estimate the amount of chinuk in 1962.
2. Flooding conditions encountered throughout June minimized efficiency of the subsistence fishery.

An increase of 75 dog nets was tabulated in 1962. This increase was due to a greater number of fishermen participating in the August commercial fishery for small salmon than in 1961. These fishermen took relatively few numbers of salmon for subsistence purposes. A large proportion of the total gear recorded made relatively small catches of salmon up to the time of the survey.

District II extends from Mountain Village through Holy Cross (it includes both of these villages). The Innoko River drainage is included in this district. This district is an area of a less intensive commercial fishery than District I and subsistence dependence is greater. Most of the catch is taken by dog nets, but fishwheels make important contributions to the catch especially in the upper end of this district.

The king catch per fishing family was much less in 1962 when compared to 1961. A major reason for this lowered catch is that the commercial season for kings lasted six (6) days later for the lower half of this district in 1962. High water and drift in June also resulted in lower catches.

Chums per family increased in 1962. The fact that this district was surveyed an average of five days later in 1962 is offset by the six day extension of the king commercial fishing season. Therefore there was a near equal number of days for 1961 and 1962 that subsistence fishing could be conducted (during the commercial season, commercial fishermen cannot subsistence fish on closed periods). Many chums caught incidentally by king nets during the king season are utilized for subsistence purposes. It was noted, for example, that in June, 1962, greater numbers of drying chum salmon were present in the Mountain Village-St. Marys area than in 1961. This indicates either a larger early run of chums or an increased effort on the part of commercial fishermen to utilize incidentally caught chum salmon. The village of Pilot Station took over 8,000 more chums in 1962 due to the fact that more fishermen were fishing for subsistence purposes. Many Pilot Station fishermen were employed on a local construction project in 1961 which reduced or stopped their fishing effort.

District III begins a few miles upstream from Holy Cross and extends to just below the village of Koyukuk. As there is no commercial fishing and very little other employment in this district, dependence on subsistence fishing is probably the greatest of any other district. Large quantities of chums are taken while very few kings are caught in this district. The most common type of gear used is the fishwheel.

The chum catch per fishing family in 1962, much less than in 1961, was still the greatest catch made in any district. Reasons for the reduced 1962 catch of chums are not known, but flooding during the fishing season may have been a contributing factor. The village of Kaltag was the only village in this district having a chum catch equal to 1961. The Department had personnel stationed in Kaltag to tabulate salmon catches in 1962 and this may have induced a greater fishing effort by Kaltag fishermen.

No major changes of pink salmon were observed above Anvik during the two years surveys were conducted. In 1961, a few pinks were noted in the Shageluk and Holikachuk camps located midway between Anvik and Kaltag.

District IV extends from Koyukuk through Tanana (it includes both of these villages). This district also includes villages on the Koyukuk River drainage. Moderate king and chum catches are made in comparison with other districts. There is very little commercial fishing, but there are increased opportunities for summer employment. Fishwheels capture most of the salmon taken for subsistence purposes. The greater number of king nets used over that of District III may largely account for the greater king catch for District IV.

Thirty-nine (39) fewer families were surveyed in 1962. Construction projects in Koyukuk, Ruby, and Tanana employed many people who otherwise would have subsistence fished.

Other than the flooding conditions that prevailed during the king run, the reasons for the reduced 1962 per family king catch are not known.

The chum catch per family was greater in 1962 even though August storms minimized fishing effort and even swept some fishwheels downriver. However, this district was surveyed an average of 12 days later than 1961 and this probably influenced the catch figures.

District V includes the Tanana River drainage. In 1961 and 1962, only the villages of Manley Hot Springs, Minto, and Nenana were surveyed. Some subsistence utilization is known to occur upstream from Nenana. In the area surveyed, all salmon were taken by fishwheels. There is some commercial fishing plus some other employment available to the people in this district. Of the three villages surveyed, Minto was judged to have a relatively high degree of dependence on a subsistence fishery.

The catch of kings per family, which seems to be characteristically low, decreased in 1962. In 1961, one fisherman fishing seven miles below the mouth of the Kantishna River took 325 or 49% of the total number of kings taken in this district. This site was not fished in 1962 and may account for the district's reduced catch.

The per family catch of chums almost tripled in 1962 as compared to 1961, but since this district was surveyed an average of nine days later than in 1961, the size of the 1962 run cannot be thought to be proportionately as large. The fall run chums were just beginning to run in the Tanana in 1961 when the survey was made.

District VI extends from above Tanana and the Tanana River mouth upstream through Fort Yukon. It includes villages located on the Chandalar and Porcupine Rivers that are not discussed in this section. There is some commercial fishing and other employment (construction, firefighting) in this district and subsistence dependence is moderate. Fishwheels catch the majority of salmon utilized for subsistence purposes.

This district in 1961 and 1962 had the second highest king catch per family. The king catch was greater in 1962 than 1961. Districts located downriver all showed decreases in king catches during 1962. The lowered catches in downriver locations, both commercial and subsistence, were influenced by flooding conditions during most of the king run and apparently a larger proportion of kings in 1962 was able to escape upriver. It is also probable that the king run reached this area of the river after the high water had subsided.

The chum catch per family was nearly equal for both years. The two surveys are not comparable since the 1962 survey was conducted later in the season. For this reason, a smaller chum run in this area for 1962 is indicated.

District VII includes all of the Yukon drainage above Fort Yukon. This district includes subsistence fisheries in the Canadian portion of the drainage surveyed in 1962. This district, at least in the area from above Fort Yukon to Dawson, has a low degree of dependence on a subsistence fishery; i.e., an average of only three dogs are kept by each fishing family.

This district for both years had the highest king catch per family. As in District VI, the king catch for each fishing family is greater in 1962. This catch likely increased for the same reasons as given for District VI.

The increased chum catch in 1962 resulted from large catches made at Dawson. The reason for this larger catch is not known, but surveys may have been conducted later in the season and until fishermen quit fishing. In 1961, the chum run was still being fished when the survey was made.

SUBSISTENCE FISHERY AND ESCAPEMENT SUMMARY:

In equivalent areas, the number of families fishing for subsistence on the Yukon River drainage declined from 645 (3,734 people) in 1961 to 579 (3,359 people) in 1962. This represents a decrease of 10% in 1962. The number of chum salmon nets increased 16% in 1962, but the number of king nets and fishwheels decreased 15% and 19% respectively in 1962. In 1962, 10,709 less kings (-45%), 76,488 less chums (-19%), and 1,633 less pinks (-75%) for a total of 87,792 less salmon (-20%) were taken compared to 1961. Table XX presents this data by district and for the drainage.

Subsistence fishery dependence, and therefore fishing effort over the past few years, has undergone a gradual decline. In part, the decreased effort in 1962 is probably a continuation of this decline. However, the local employment situation greatly alters effort and dependence in any given year. The decreased effort in 1962 accounts for part of the decrease in catch over 1961.

However, as shown in Table XX, the average catch per family of kings decreased by 39% over 1961 and of chums by 10% for equivalent areas of the drainage.

Catches of kings per family increased quite sharply in Districts VI and VII at the upper end of the drainage in 1962. All districts below these two showed a decline in catch per family of kings from 1961. Apparently the king run to the portion of the drainage above the confluence of the Tanana River was very good. Since kings caught in Districts VI and VII must have passed through the subsistence fishery in Districts I through IV, the difference in catch per family must be due to a difference in effort, fishing conditions, or dates fishermen started fishing. Kings are the first salmon to enter the Yukon, and the first to enter the subsistence fishery. It is known that severe flooding conditions, high water and drift, prevailed in June and early July throughout the lower districts. This is the period when the majority of the king run and the first part of the chum run would have passed through this area. The exact water conditions by village and dates are not known, but the most obvious reason for the lower catch per family of kings in District I through IV seems to be fishing conditions. The higher catch per family of kings in Districts VI and VII, therefore, is probably the result of two factors: reduced catches in the subsistence and commercial fisheries downriver most likely because of drift, high water, and timing of the closures in the commercial fishery, and the fact that the king run probably reached Districts VI and VII at a time when flooding conditions had abated.

The difference between the 1961 and 1962 overall catch per family of king and chum salmon is probably due at least partially to the above reasons. However, because there is no way known to quantitatively assess the effect of water conditions on either the commercial or subsistence fisheries, it is very difficult to make a general statement about comparative run sizes in 1961 and 1962.

MORPHOLOGICAL DATA--KING SALMON:

A total of 370 king salmon were examined on the Yukon River in 1962 by the Alaska Department of Fish and Game. These fish were sexed, measured, weighed in one sample, and a scale was taken from each. Samples were taken from the commercial catch at the Mountain Village saltery (June 19) and at St. Marys cannery (June 23 and 30). The subsistence fishery at Kaltag, 441 miles above the mouth, was sampled for king salmon from June 23 to July 25.

A total of 244 of the scale samples taken were aged. The balance were either regenerated, reversed on the scale cards, or too mutilated to age. Of these 244, 93 were from Kaltag and 151 from the lower Yukon commercial fishery. A summary of ages, age frequency, and length of the sampled salmon is shown in Table XXI.

The commercial fishery for king salmon on the lower Yukon is prosecuted almost entirely with 8 1/2" gill net. This, of course, biases the sample size composition. The Kaltag subsistence fishery utilizes fishwheels and gill nets ranging from 4" to 8" stretched mesh. The subsistence fishery, therefore, samples a wider range of age classes than the commercial fishery. Its sample, however, is also biased and does not give a true picture of run composition as will be shown later. Because of these different biases, the analyses of the lower Yukon and Kaltag samples are presented separately.

All king salmon aged were found to have spent one year in fresh water. With a few exceptions, the final annulus was at the outer margin of the scale (no current growth). In the Kaltag sample, many of the scales exhibited re-absorption of the outer margin and the final annulus was not present. However, in every case but one (a 3_1), the missing annulus was assumed to be present. Counts were made of circuli present between the annuli on the antero-lateral

TABLE XXI

AGE LENGTH AND SEX OF YUKON KING SALMON, 1962

	Age	Kaltag		Lower Yukon	
		Male	Female	Male	Female
Range in Centimeters*	3_1	50			
	4_1	54-75			
	5_1	65-93	69-101	73-91	
	6_1	70-109	81-103	72-108	82-100
	7_1	116-118	103-112	105-109	87-110
Frequency	3_1	1			
	4_1	13			
	5_1	35	2	6	
	6_1	18	18	59	63
	7_1	2	4	6	17
$\bar{X}$ Length	3_1	50			
	4_1	62			
	5_1	72	85	79	
	6_1	94	94	94	91
	7_1	117	106	109	98
Sex Ratio		69:24		71:80	

* Snout to fork of caudal fin.

axes of the scale. These counts were quite consistent and were necessary in the aging of the scales since checks (false annuli) were found on several scales between the first and second annuli, the second and third annuli, and the third and fourth annuli. The check between the first and second annuli was the most common. Circuli counts are summarized below. These counts were made from the outer edge of restricted growth on one annulus to the inner edge of the next.

	Focus to 1st Annulus	Number of Circuli 1st to 2nd	2nd to 3rd	3rd to 4th	4th to 5th	5th to 6th
Range	6-10	17-34	8-21	7-23	10-20	11-15
Mean	8	22	15	15	15	13

Age composition of the lower Yukon sample was:

	Percentage		
Age	5_1	6_1	7_1
Male	4%	39%	4%
Female	___	42%	11%
TOTAL	4%	81%	15%

The total absence of 3_1 and 4_1 fish should be noted as well as the total lack of 5_1 females. The sexes were present in about equal proportion as 6_1's, and the females predominated in the 7_1 age class. The early part of the king run was not sampled and could have changed the overall sex:age ratio considerably.

The Kaltag sample was taken throughout the king run with a variety of gear. Age composition was:

	Percentage				
Age	3_1	4_1	5_1	6_1	7_1
Male	1%	14%	38%	19.5%	2%
Female	___	___	2%	19.5%	4%
TOTAL	1%	14%	40%	39.0%	6%

No 3_1 or 4_1 females were present in the sample and very few 5_1 females were taken. The majority of the fish aged were taken by fishwheel or small salmon gill net (4" to 5" stretched mesh). The 3_1 male, the 4_1 males, and most of the 5_1 males were taken with this gear. This then is the major reason so few of these age classes were taken in the commercial fishery where only the 8 1/2" mesh was used.

It is impossible to assess the effect of the commercial fishery on the age:sex composition of the run reaching the spawning grounds with the data available. It is apparent that the commercial fishery (or at least the portion sampled) takes the majority of its catch from the 6_1 age class of kings. This undoubtedly has an effect on the proportion of these fish reaching the upriver subsistence fishery and the spawning grounds. The proportion of females in the run would be the most affected since apparently most of the famles are either 6_1's or 7_1's with very few 5_1's. More females than males were taken in the commercial fishery, but the sample is too limited to draw any definite conclusion. Also, the use of king gear at Kaltag was too limited to get a picture of run composition. The large proportion of 4_1 and 5_1 males in the catch may have been totally due to the selectivity of the fishwheel and chum salmon gill net for these smaller fish. It would be very valuable to obtain a good sample from an upriver commercial fishery such as the one at Holy Cross during the 1963 season. It will also be necessary to obtain a larger and more complete sample from the lower Yukon commercial fishery.

YUKON TAGGING PROJECT:

A detailed discussion of this project has been presented in a report to the U. S. Fish and Wildlife Service which will be available shortly.